

## NOVEL ULTRASOUND CONTRAST AGENTS

### ABSTRACT

New ultrasound contrast agents that comprise microbubbles encapsulating a gas within a shell made from a blend of bipolar compounds having mixed carbon chain length. The compounds have hydrophobic groups selected from the group consisting of straight-chained alkyls, alkylethers, alkylthioethers, alkyldisulfides, polyfluoroalkyls, and polyfluoroalkylethers having a carbon chain length greater than or equal to 16 and less than or equal to 32. The polar groups are connected to the hydrophobic groups by means of a linker. The polar head groups are selected from the group consisting of  $\text{CO}_2\text{-M}^+$ ,  $\text{SO}_3^-\text{M}^+$ ,  $\text{SO}_4^-\text{M}^+$ ,  $\text{PO}_3^-\text{M}^+$ ,  $\text{PO}_4^-\text{M}^+{}_2$ ,  $\text{N}(\text{R})_4^+$ , a pyridinium or substituted pyridinium group, and a zwitterionic group; R is selected from the group consisting of -H, -CH<sub>3</sub>, alkyl, cycloalkyl, substituted cycloalkyls containing one or more heteroatoms, and benzyl and can be the same or different; and Z' is a nonionic and M is a cation.